**Sealing device**

The invention relates to a sealing device for the external sealing of a collet chuck housing of a machine tool with an inserted collet chuck and with a preceding sealing washer, which is provided, in its cylindrical surface facing towards the tool shank, with an annular circumferential groove and with an elastic sealing body disposed in said groove.

It is known for this purpose to provide a tensioning nut with a sealing washer which outwardly locks the front side of the tensioning nut, i.e. the side facing away from the machine. In the cylindrical surface of the feedthrough facing towards the tool shank, such sealing washers conventionally possess an annular groove in which an O-ring is disposed. The dimensions of the O-ring are such that it sits elastically against the tool shank, closing the annular gap between said shank and the sealing washer. The seal is substantially provided by the elasticity of the O-ring.

At higher internal pressures of the coolant, the seal is not always assured, especially when the elasticity and the surface of the O-ring have been degraded by prolonged use.

The object of the invention is to provide a sealing device which has an improved resistance to higher internal pressures.

This object is achieved according to the invention by making the width and depth of the groove provided in the surface of the sealing washer facing towards the tool shank larger than the diameter of the elastic sealing body so that the latter can move axially in the groove. The sealing body is preferably an O-ring.

A preferred embodiment of the invention is described below with the aid of the accompanying drawing.

Fig. 1 is a sectional view of a clamping device with a tensioning nut and sealing washer;

Fig. 2 shows enlarged details of the feedthrough of the sealing washer; and

Fig. 3 shows the same details together with the compression.

The clamping device for a tool shank 1 shown in Fig. 1 consists of a collet chuck housing 2, an inserted collet chuck 3 and a tensioning nut 4. Located on the face of the tensioning nut 4 is a sealing washer 5 inserted from the back, i.e. from the machine side. The sealing washer 5 has a feedthrough for the tool shank and, in the cylindrical surface 6 facing towards the tool shank 1, is provided with an annular circumferential groove 7 in which an O-ring 8 is disposed. The arrows 9 indicate the direction of flow of the coolant in the slots of the collet chuck 3 and in the bore of the tool shank 1.

In contrast to the conventional grooves for O-rings, the groove 7 in the present case is wider and deeper than the diameter of the O-ring 8 so that the latter is axially displaceable in the groove. This can be seen in Fig. 2, where in Fig. 2a the O-ring 8 is located axially in the middle of the groove 7, in which position it would have no sealing function per se.

In Fig. 2b the O-ring is axially displaced and sits against a side wall of the groove. In this position the feedthrough is sealed, especially when the O-ring 8 is compressed by the coolant pressure against the side wall of the groove and also simultaneously against the tool shank 1. This is shown in Fig. 3, where the arrows 10 indicate the internal pressure. Fig. 3a shows a situation in which a tool shank of smaller diameter is inserted. In Fig. 3b a tool shank of larger diameter is inserted, the gap between the shank and the feedthrough of the sealing washer being narrower. This adaptation to tool shanks of different thicknesses is better assured with the solution according to the invention than with the conventional solution.

According to an as yet unpublished proposal, the collet chuck rather than the tensioning nut can be provided with a sealing washer. The solution according to the invention is equally suitable for this type of sealing washer.